ABSTRACT OF THE DISCLOSURE

Input signals are transformed with an Hadamard transformation matrix in each of the four four-point Hadamard transformation units, wherein a rounding unit rounds up the least significant bit of each of the odd number of coefficients and discards the least significant bit of each of the remaining odd number of coefficients among the four transformed coefficients output from each of the four-point Hadamard transformation units to produce four sets of four integer coefficients, and one integer coefficient is selected from each set, and four selected integer coefficients including odd number of rounded up are input to an Hadamard transformation unit and are Hadamard transformed, and the Hadamard transformed coefficients are rounded up to produce integer.